AMENDMENTS TO THE CLAIMS

1. (Currently amended) A laser comprising:

a substrate comprising a bulk region and a conducting layer;

an active region comprising a quantum cascade structure provided on a first surface of the substrate such that said active region is electrically connected to said conducting layer, the active region being formed of a plurality of layers having a thickness selected such that the energy spacing of sub bands formed by the layers causes the active region to lase at a frequency in the range from 100 GHz to 20 THz;

first and second contacts provided to said conducting layer such that said first and second contacts are electrically connected to said active region, said first and second contacts being disposed on opposite sides of said active region, with said active region positioned between said first and second contacts; and

an active region contact provided to said active region such that a potential may be applied between said active region contact and said first and second contacts to cause said active region to lase.

2. (Original) A laser according to claim 1, wherein the conducting layer comprises a highly doped semiconductor.

3. (Original) A laser according to claim 2, wherein the conducting layer is thin enough, such that in operation, the two surface plasmons present at the two interfaces of the conducting layer merge into a single mode.

4. (Currently amended) A laser according to 2, wherein the cascade laser is configured to emit photons having a frequency in the range from 0.02 THz to ~~100~~ 10 THz.

5. (Withdrawn) A laser comprising:

a substrate comprising a bulk region and a metal conducting layer;

an active region comprising a quantum cascade structure provided on a first surface of the substrate such that the active region is electrically connected to said conducting layer, said active region being configured to emit radiation in the frequency range of up to 12 THz;

a first contact provided to said conducting layer such that said first contact is electrically connected to said active region; and

an active region contact provided to said active region such that a bias may be applied between said active region and said first contact to cause said active region to lase.

6. (Withdrawn) A laser according to claim 5, further comprising a second contact, provided to said conducting layer, on an opposing side of said active region to said first contact.

7. (Previously presented) A laser according to claim 1, wherein the resistance between the first and active region contacts or second and active region contacts is less than three times the resistance of the active region.

8. (Previously presented) A laser according to claim 1, wherein the resistance between the first and active region contacts or second and active region contacts is less than twice the resistance of the active region.

9. (Previously presented) A laser according to claim 1, wherein said first and second contacts are symmetric about said active region.

10. (Previously presented) A laser according to claim 1, wherein the dielectric constant of the conducting layer is negative relative to the dielectric constant of the surrounding layers.

11. (Previously presented) A laser according to claim 1, wherein the active region comprises a strip waveguide.

12. (Previously presented) A laser according to claim 1, wherein the active region comprises a lamination of layers having at least two different band gaps.

13. (Previously presented) A method of fabricating a laser, the method comprising:

forming an active region which comprises a plurality of layers defining a quantum cascade laser structure overlying a first substrate;

providing a first metal layer overlying said plurality of layers;

providing a second metal layer overlying a second substrate;

placing said first and second metal layers in contact under sufficient conditions such that said first and second metal layers bond to each other;

etching said structure to remove said first substrate and to expose a surface of said plurality of layers;

forming a first contact to the metal layer formed by the bonding of said first and second metal layers; and

forming an active region contact to said active region such that a bias may be applied between said first contact and said active region contact which causes said plurality of layers to lase and output radiation in the frequency range up to 12 THz.

14. (Withdrawn) A method according to claim 13, wherein a layer comprising indium is provided overlying either or both of said first and second metal layers to aid bonding of said first and second metal layers.

15. (Canceled)